Parallel Computing for Science & Engineering CS395T

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Example code

Work-sharing Constructs and Implied Barriers

- Worksharing Constructs
  - Do/For
  - Single
  - Sections
- Constructs without a Barrier
  - Critical
  - Atomic
  - Master
  - etc.

Is this code correct?

```
!$OMP PARALLEL shared(a)

…

a = 5.

!$OMP DO
do i=1, n
  b(i) = a
enddo


…

!$OMP END PARALLEL
```

```
!$OMP PARALLEL shared(a)

…

a = 5.

!$OMP DO
do i=1, n
  b(i) = a
enddo

…

!$OMP END PARALLEL
```

Is this code correct?

All threads will execute `a = 5.`

How can we fix this?

```
!$OMP PARALLEL shared(a)

…

!$OMP CRITICAL
a = 5.
!$OMP END CRITICAL

!$OMP DO
do i=1, n
  b(i) = a
enddo


…

!$OMP END PARALLEL
```

Is there a Barrier needed at the end of the Critical Region?

Why is this solution incorrect/not optimal?

What is the implicit Barrier doing?

```
!$OMP PARALLEL shared(a)

…

!$OMP SINGLE
a = 5.
!$OMP END SINGLE

!$OMP DO
do i=1, n
  b(i) = a
enddo

…

!$OMP END PARALLEL
```

Would this work, too?

```
!$OMP PARALLEL shared(a)

…

!$OMP MASTER
a = 5.
!$OMP END MASTER

!$OMP DO
do i=1, n
  b(i) = a
enddo


…

!$OMP END PARALLEL
```